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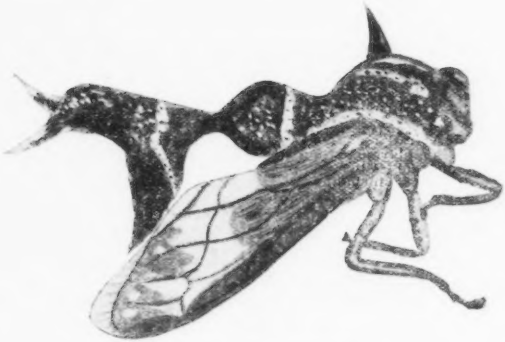
ENTOMOLOGICAL NEWS



Heteronotus vulnerans.

MARCH, 1903.

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Ernest Swinhoe, 37 Addison Gardens, London W, England

Will correspondents kindly note that I have left Oxford and that in future my address will be as above.

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THE INSECT
WORLD:
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Y. NAWA.
GIFU, JAPAN.

昆蟲世界

ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

ACADEMY OF NATURAL SCIENCES, PHILADELPHIA.

VOL. XIV. MARCH, 1903. No. 3.

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Japan's Foremost Entomologist.

BY C. L. MARLATT.

Many entomologists in this country have seen the little Japanese entomological publication entitled on the "last page" "The Insect World," a monthly magazine edited by Y. Nawa, Gifu, Japan. The illustrations of the little magazine have often been wonderfully accurate and interesting, and keen regret has undoubtedly been felt that the language proved so complete a bar to the contents.

Among the pleasantest features of the writer's recent trip in Japan were the two visits paid to Mr. Nawa's establishment at Gifu, an inland city in the very heart of ancient Japan, far removed from any of the foreign ports and showing very slight invasion of western "barbarism." Mr. Nawa is very prepossessing in appearance, rather larger than the ordinary Japanese and with a strong, kindly face. His interest in entomology is evidently inborn and 25 or 30 years ago he began his work on insects unaided and with no knowledge of foreign literature. He was formerly a man of some wealth, but in common with many of the old Japanese, under the new regime he lost his

patrimony and is now practically dependent on the receipts from his school for its maintenance. He has carried on his work in entomology with the greatest enthusiasm for these many years, and has established a sort of entomological academy or school—housed in a considerable series of buildings surrounding a court--and comprising laboratories, work rooms, museum rooms, etc. His own work and the work of his students in applied and systematic entomology is of the most creditable kind and compares favorably with that of our own agricultural colleges and experiment stations. It will be remembered that among the best of the collections of foreign insects exhibited at the World's Fair in Chicago in 1893 was one made by Mr. Nawa and which was afterwards most generously donated to the National Museum.

Mr. Nawa's academy is attended by advanced students and also by teachers and instructors from various educational institutions, colleges and universities of the Empire. Most of these students are men of mature years who are attracted by the fame of Mr. Nawa and his work and wish to fit themselves for teaching entomology or for special work in the field of applied entomology. Mr. Nawa is now 50 years old, and has devoted his life to this work from pure love of the subject and with very little aid, and the results which have followed from his industry and enthusiasm are truly remarkable. In recent years the government has recognized the extreme value of his work in education and the study of economic problems in entomology, and there is a proposition now on foot to give him a regular subsidy, small in amount but sufficient to enable him to continue his work with greater confidence.

At the time of my first visit to Gifu one of the annual provincial fairs or expositions was in progress, and Mr. Nawa's academy was also giving an entomological fair or exposition for which he had been preparing for a considerable number of years. This exhibit was open to the Japanese public, and streams of visitors were going through the gates and paying the small fee to study it. It comprised very much such an exhibit as would be made at one of our general expositions, filling several large rooms and included cases illustrating the

life habits and means of control of injurious insects, many illuminated charts and photographs representing insect work, life history studies and classification, also models of machinery for the collection and destruction of insects, and, in fact, a complete exhibit of a most creditable order. There were many handsomely colored sheets or drawings, the work of Mr. Nawa's daughter, Miss Taka Nawa, who has developed a very decided talent as a delineator of insects, and does most charming pieces in water color, several very beautiful examples of which were very kindly given to me.

The work of Mr. Nawa and his school finds its popular exploitation through the little journal mentioned above. Mr. Nawa also prepares and publishes large charts each representing one of the more important of the injurious insect pests of rice, mulberry, or other crop or fruit. These charts illustrate in color the damages to the plant and the insects in all stages, give a complete record of the insects habits for the year, and detail means of control, and are designed to be posted in public places and offices for the benefit and instruction of the rural classes in Japan. A great many such charts have already been published, copies of most of which were given to me. They are examples of the practical nature of the work which this school is putting forth. In technical entomology some very important monographs have been published which, unfortunately, are sealed works so far as the western reader is concerned.

It may perhaps be remembered that some ten or twelve years ago central Japan was visited by one of those terrific earthquakes which sometimes destroy towns and villages and human life by the thousands in those very unstable and volcanic islands, and at this time the Nawa establishment was leveled to the ground and the collections, the work of many years, were many of them destroyed or damaged beyond repair. In spite of this setback the establishment had been entirely replaced and the collections are again on a very creditable footing. In the country about, Mr. Nawa makes his investigations and practical experiments with the aid of his students and assistants.

During the few days spent in Gifu the writer was the recipient of distinguished social attentions. Mr. Nawa gave a very charming Japanese dinner in one of the notable restaurants of the city and the following day the governor of the province gave a very elaborate dinner in a beautiful park. The writer also was given a most artistic porcelain model of the local butterfly of Gifu, the "Gifu cho" (*Leuhdorfia japonica*), which had been specially made for distribution to distinguished visitors to the entomological exposition. This butterfly is the species which adorns the title page of each number of "The Insect World."

Miss Nawa, an only child, is a very demure and modest Japanese girl who has evidently inherited her father's love for the study of insects, a thing not surprising when one sees the enthusiasm which pervades the whole family, and includes the mother and relatives. Japanese names as a rule mean something, and Miss Nawa's given name, Taka, is Japanese for ladybird, an appropriate name for the daughter of so enthusiastic an entomologist as is Mr. Nawa. The only present which I could persuade Miss Nawa to take in return for the many colored drawings which she had given me was a promise of a complete set of the best Windsor-Newton colors, and these I was able to make up partly at Yokohama, and the balance I sent to her after my return to America. At a later visit to Gifu for two days only and more especially for explorations in an adjacent orchard district, the writer was taken out on the river which runs through the town and given an exhibition of the method of fishing with cormorants at night with great flaming iron baskets of wood as lanterns, one of the most weird and attractive incidents of his Japanese trip. The hospitality of the Nawas is only exceeded by their enthusiasm in the study of entomology, and any entomologist visiting Japan will feel well rewarded by going to Gifu.

ERRATUM.

On the 8th line from the bottom of page 55 (Feb. NEWS) our printer has coined a new specific name. It is not half bad and is Latin sounding, and we recommend it to someone in need of a name for a new species. The name the writer hoped to see in print was *jucunda*.

The Moths (Heterocera) of Eastern Pennsylvania.

By Philip Laurent.

(Continued from page 45.)

Liparidæ.

Orgya leucostigma *S. & A.*, common.
Parorgyia clintonii *G. & R.*, rare.
Lagoa crispata *Pack.*, rare.
" opercularis *S. & A.*, rare.

Limacodidæ.

Parasa chloris *H.-S.*, rare.
Euclea incisa *Harv.*, rare.
" cippus var querceti *H.-S.*, rare.
Euclea cippus var interjecta *Dyar*, rare.
Adoneta spinuloides *H.-S.*, common.
Empretia stimulea *Clem.*, common.
Phobetron pithecium *A. & S.*, rare.
Limacodes scapha *Harr.*, rare.
" y-inversa *Pack.*, rare.
" fasciata *H.-S.*, rare.
Packardia geminata *Pack.*, rare.
" albipunctata *Pack.*, rare.
Tortricidia testacea *Pack.*, rare.

Psychidæ.

Psyche confederata *Grt.*, common.
Thyridopteryx ephemeræformis *Steph.*, common.
Lacosoma chiridota *Grt.*, rare.
Perophora melsheimerii *Harr.*, rare.

Notodontidæ.

Ichthyura inclusa *Hbn.*, common.
" vau *Fitch*, rare.
" albosigma *Fitch.*, rare.
Apatelodes torrefacta *S. & A.*, rare.
Apatelodes angelica *Grt.*, rare.
Datana angusii *G. & R.*, common.
" ministra *Dru.*, common.
" major *G. & R.*, rare.
Datana integerrima *G. & R.*, rare.
" contracta *Walk.*, rare.
" perspicua *G. & R.*, common.
Nadata gibbosa *S. & A.*, rare.
" doubledayi *Pack.*, rare.
Hyparpax aurora *S. & A.*, rare.
Gluphisia trilineata *Pack.*, rare.
Notodonta stragula *Grt.*, rare.
Pheosia dimidiata *H.-S.*, common.
Nerice bidentata *Walk.*, rare.
Edema albifrons *S. & A.*, common.
Seirodonta bilineata *Park.*, rare.
Oedemasia concinna *S. & A.*, rare.
" eximia *Grt.*, rare.
" nitida *Pack.*, rare.
" badia *Pack.*, rare.
Dasylophia anguina *S. & A.*, rare.
Schizura ipomeæ *Doub.*, rare.
" " var. cinereofrons *Pack.*, rare.
Schizura telifer *Grt.*, rare.
" unicornis *S. & A.*, rare.
" leptinoides *Grt.*, rare.
Ianassa lignicolor *Walk.*, rare.
Heterocampa obliqua *Pack.*, rare.
" pulverea *G. R.*, rare.
" marthesia *Cram.*, rare.
Heterocampa biundata *Walk.*, rare.
" cinerea *Pack.*, rare.
" unicolor *Pack.*, rare.
" manteo *Doub.*, rare.
Cerura borealis *Bdv.*, rare.
" cinerea *Walk.*, rare.

Platypterygidæ.

Platypteryx arcuata *Walk.*, rare.
" genicula *Grt.*, rare.
Prionia bilineata *Pack.*, rare.
Dryopteris rosea *Walk.*, rare.

Saturniidæ.

Samia cynthia *Dru.*, common.
Attacus promethea *Dru.*, common.
" angulifera *Walk.*, common.
" cecropia *Linn.*, common.
Actias luna *Linn.*, common.
Telea polyphemus *Cram.*, common.
Hyperchiria io *Fab.*, common.

Ceratocampidæ.

Eacles imperialis *Dru.*, common.
Citheronia regalis *Fab.*, rare.
Anisota stigma *Fab.*, rare.
" senatoria *S. & A.*, common.
Anisota virginiensis *Dru.*, common.
Dryocampa rubicunda *Fab.*, common.

Bombycidæ.

Hemileuca maia *Dru.*, rare.
Clisiocampa americana *Harr.*, common.
Clisiocampa disstria *Hbn*, rare.
Artace rubripalpis *Feld.*, rare.
Tolype velleda *Stoll.*, rare.
" laricis *Fitch.*, rare.
Sericaria mori *Linn*
Gastropacha americana *Harr.*, rare.

Cossidæ.

Cossus macmurtriei *Peale.*, rare.
Prionoxystus robiniæ *Pack.*, common.
Zeuzera pyrina *Linn.*, rare.

Hepialidæ.

Hepialus argenteomaculatus *Harr.*, rare.

Thyatiridæ.

Thyatira scripta *Gosse.*, rare.
Euthyatira pudens *Gn.*, rare.
Pseudothyatira cymatophoroides *Gn.*, rare.
Pseudothyatira cymatophoroides var. expultrix *Grt.*, rare.
Leptina ophthalmica *Gn.*, rare.
" doubledayi *Gn.*, rare.

Noctuidæ.

Panthea acronyctoides *Walk.*
Raphia abrupta *Grt.*, rare.
" frater *Grt.*, rare.
Charadra deridens *Gn.*, rare.
Diptherа fallax *H.-S.*, rare.
Acronycta occidentalis *G. & R.*, common.
Acronycta morula *G. & R.*, rare.
" lobeliæ *Gn.*, rare.
" telum *Gn.*, rare.
" innotata *Gn.*, rare.
" albarufa *Grt.*, rare.
" vinnula *Grt.*, rare.
" spinigera *Gn.*, rare.
" americana *Harr.*, common.
Acronycta dactylina *Grt.*, rare.
" rubricoma *Gn.*, rare.
" luteicoma *G. & R.*, rare.
" afflicta *Grt.*, rare.
" brumosa *Gn.*, common.
" superans *Gn.*, rare.
" funeralis *G. & R.*, rare.
" ovata *Ort.*, rare.
" hamamelis *Gn.*, common.
Acronycta retardata *Walk.*, rare.
" sperata *Grt.*, rare.
" xyliniformis *Gn.*, rare.
" lithospila *Grt.*, rare.
" oblinita *S. & A.*, common.
Harrisimemna trisignata *Walk.*, rare.
Cerma cora *Hbn.*, rare.
Polygrammate hebraicum *Hbn.*, rare.
Micrococlia diptheroides *Gn.*, rare.
" var. obliterata *Grt.*
Bryophila lepidula *Grt.* rare.
" teratophora *H.-S.*, rare.
Chytonix palliatricula *Gn.*, rare.

Rhynchagrotis brunneicollis *Grt.*, rare.
Rhynchagrotis alternata *Grt.*, rare.
Adelphagrotis prasina *Fab.*, rare.
Eueretagrotis perattenta *Grt.*, rare.
Agrotis badinodis *Grt.*, rare.
" violaris *G. & R.*, rare.
" ypsilon *Rott.*, common.
" geniculata *G. & R.*, rare.
Peridroma occulta *Linn.*, rare.
Noctua baja *Fab.*, rare.
" normaniana *Grt.*, rare.
" bicarnea *Gn.*, rare.
" c-nigrum *Linn.*, common.
" phyllophora *Grt.*, rare.
" plecta *Linn.*, rare.
" haruspica *Grt.*, rare.
" clandestina *Harr.*, common.
Feltia subgothica *Steph.*, common.
" jaculifera *Gn.*, common.
" herilis *Grt.*, common.
" venerabilis *Walk.*, rare.
" annexa *Tr.*, common.
Carneades pitychrous *Grt.*, common.
Carneades messoria *Harv.*, common.
Carneades rubefactalis *Grt.*, rare.
" tessellata *Harr.*, common.
Carneades redimicula *Morr.*, common.
Dicopis muralis *Grt.*,
Mamestra nimbosa *Gn.*, rare.
" imbrifera *Gn.*, rare.
" detracta *Walk.*, rare.
" distincta *Hbn.*, rare.
" subjuncta *G. & R.*, common.
Mamestra trifolii *Rott.*, common.
" congermana *Morr.*, rare.
" picta *Harr.*, common.
" latex *Gn.*, rare.
" adjuncta *Bdv.*, rare.
" legitima *Grt.* rare.
Mamestra renigera *Steph.*, common.
Mamestra lorea *Gn*, rare.
Hadena passer *Gn.*, rare.
" remissa *Hbn.*, rare.
" apamiformis *Grt.*, rare.
" sputatrix *Grt*, common.
" impulsa *Gn.*, rare.
" devastatrix *Brace.*, common.
Hadena arctica *Bdv.*, common.
" verbascoides *Gn.*, rare.
" cariosa *Gn.*, rare.
" vulgaris *G. & R.*, rare.
" lignicolor *Gn.*, rare.
" modica *Gn.*, rare.
" turbulenta *Hbn.*, rare.
" miseloides *Gn.*, rare.
" vulvivaga var. fractilinea *Grt.*, rare.
Oligia festivoides *Gn.*, rare.
" grata *Hbn.*, common.
Perigea xanthiodes *Gn.*, rare.
" luxa *Grt.*, rare.
" epopea *Cram.*, rare.
" fabrefacta *Morr.*, rare.
Dipterygia scabriuscula *Linn.*, rare.
Hyppa xylinoides *Gn.*, common.
Homohadena badistriga *Grt.*, common.
Macronoctua onusta *Grt.*, rare.
Actinotia ramosula *Gn.*, rare.
Laphygma frugiperda *S. & A.*, rare.
Laphygma frugiperda var. obscura *Riley.*, rare.
Prodenia lineatella *Harv.*, rare.
" flavimedia *Harv.*, common.
Prodenia commelinæ *S. & A.*, rare.
Trigonophora periculosa *Gn.*, rare.
Brotolomia iris *Gn.*, rare.
Euplexia lucipara *Linn.*, common.
Nephelodes minians *Gn.*, rare.
Helotropha reniformis *Grt.*, rare.

Hydroecia velata *Walk.*, rare.
" nictitans *Bkh.*, common.
" cataphracta *Grt.*, rare.
" nitela *Gn.*, rare.
" " var. nebris *Gn.*, rare.
Achatodes zeæ *Harr.*, rare.
Euthisanotia timais *Cram.*, rare.
Arzama obliquata *G. & R.*, common.
Arzama densa *Walk.* ?
" vulnifica *Grt.*, rare.
Monodes nucicolora *Gn.*, rare.
Leucania pallens *Linn.*, rare.
" albilinea *Hbn.*, common.
" phragmatidicola *Gn.*, common.
Leucania commoides *Gn.*, common.
Leucania unipuncta *Harv.*, common
Leucania pseudargyria *Gn.*, common.
Scolecocampa liburna *Geyer*, rare.
Nolophana malana *Fitch.*, common.
" zelleri *Grt.* ?
" labecula *Grt.* ?
Crambodes talidiformis *Gn.*, rare.
Caradrina miranda *Grt.*, common.
Pyrophila pyramidoides *Gn.*, common.
Orthodes infirma *Gn.*, common.
" cynica *Gn.*, rare.
" enervis *Gn.*, common.
Himella intractata *Morr.*, rare.
Taeniocampa modifica *Morr.*, rare.
" alia *Gn.*, rare.
Choephora fungorum *G. & R.*, rare.
Cosmia paleacea *Esp.*, rare.

(To be continued.)

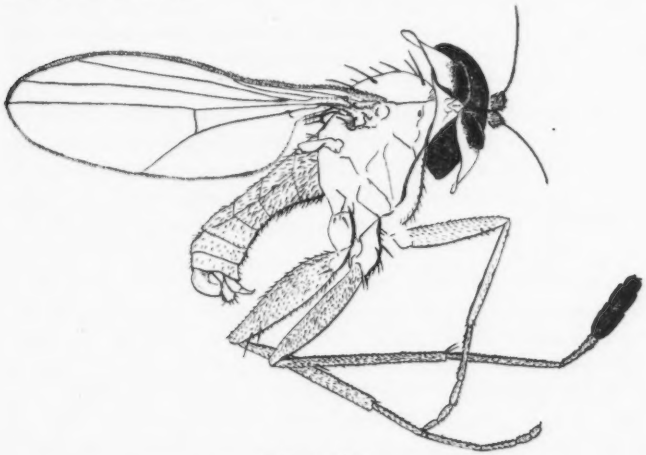
An Interesting New Chrysotus.

[Contributions from the Zoological Laboratory of the University of Texas. No. 42.]

By A. L. Melander.

Chrysotus philtrum sp. nov. *Male.*—Metallic green species with yellow legs. Head large, hemispherical, wider than the thorax: eyes large, narrowly contiguous below the antennæ, facets moderate, gradually larger below. Antennæ short, yellow, the first two joints short, simple, transverse, first joint bare, second and third joints bushy with black hairs, the terminal hairs equal in length to the third joint; third joint slightly compressed, rounded conical, short, equalling the length of the other two joints together, its terminal black arista as long as the eye-height, sparsely beset with short hairs, the distances between the apical ones slightly exceeding the length of these hairs. Face obliterated below the antennæ, becoming elongate-triangular lower down, small, black, vertex broad, with violet-blue-green reflections, the two ocellar bristles strong, recurved, an occipital incurved bristle present on each side of the vertex, postoculars wanting, postocular cilia wanting, the sparse hairs dusky below. Occiput with a violet tinge. Proboscis short, black, concealed beneath the base of the enormously dilated and flattened, subulate palpi, palpi two and one-half times as long as wide, literally projecting beyond the margin of the head, entirely flat, the base, rounded, broad, black in front, the outer half white, excised in front, lanceolate, the blunt

tip twisted, the entire palpus covered with fine silvery sericeous hairs which give even to the black base a glistening silvery color when viewed from certain directions.



Chrysotus philtrum.
The middle tarsus and the head are twisted to show the ventral aspect.

Thorax quadrate, humeri rectangular, dorsum metallic green, slightly brassy towards the roots of the wings. Acrostichals short and sparse, approximated into a single median series; the inner row of dorsicentrals with five moderate bristles, the outer row with four; a few humeral bristles present: scutellum with two distant long bristles: posterior portion of mesonotum but little depressed: entire pleura slaty with cinereous dust. Abdomen depressed basally, metallic brassy green, entirely but rather sparsely covered with short stiff black hairs. Hypopygium small, terminal, compressed, concolorous with the remainder of the abdomen, bare. The sixth ventral emits a pair of short, hooked, chitinous appendages, between which is a small fleshy hairy process.

Coxæ and legs yellow, the middle and hind coxæ somewhat darkened above on the basal half, second joint of middle tarsi white, three outer joints of middle tarsi black. Legs slender and comparatively long, provided with short dark hairs, middle tibiæ somewhat exceeding their femora, one-third longer than their metatarsi; middle metatarsi nearly as long as the remainder of the tarsus; middle and hind tibiæ provided with a glabrous streak on the outer edge, that of the middle tibiæ well-defined by a limiting series of short bristles, both tibiæ with a bristle on the basal third of the outer edge: last three joints of the middle tarsi strongly compressed, straight below but each joint arched and outwardly

produced on the outer side: remainder of legs simple, ungues and pulvilli minute.

Halteres pale luteous. Tegular cilia short, sparse, dusky. Wings normal, clear hyaline, strongly iridescent, costa nowhere thickened, third and fourth veins parallel, posterior cross-vein short, perpendicular to the wing-axis, less than one-half the length of the outer portion of the fifth vein, sixth vein faint.

Three males. Length 1.75 mm. Chester Co., Pennsylvania, June 3, 1902 (J. Chester Bradley), Opelousas, Louisiana, and Austin, Texas, May 2, 1902. These specimens from such distant localities were taken in net sweepings, the Texan one in the rank herbage along the Colorado River at the base of Mount Bonnell.

This curious little fly has its nearest relatives in the genus *Chrysotus*, for which it shows its affinities by the contiguity of the eyes below the antennæ, the width of the vertex, the very short antennæ, the small pulvilli and the lack of true bristles on the hypopygium. The depressions of the mesonotum in front of the scutellum is not marked enough to exclude it from this division. Moreover, a number of *Chrysotus* recently described show greatly lengthened palpi, as *albipalpus* Aldrich, for instance. The first species described under this genus were stout and possessed short legs and rather broad wings, but forms later described show that a stature as slender as that of the present species may obtain also. Its narrowed wings and slender legs suggest an affinity to *Diaphorus*, but here also the middle legs are never longest, while the minute pulvilli, the obliterated face and the glabrous hypopygium preclude this genus.

Curiously enough all other genera of *Dolichopodidæ* have their palpi either incumbent upon the proboscis or hanging by its side. The enormous size of the palpi of *philtrum* in relation to the minute proboscis naturally can not allow of this juxtaposition and the palpi are free to grow laterally. In the genus *Orthochile* the palpi are ribbon-like, in *Diostracus* and *Aphrosylus* they are spoon-shaped, all the remaining members of this family have the palpi small and comparatively scale-like. Thus the present species departs in the shape as well as the size and orientation of its mouth-parts. As an interesting

accompaniment of the enlarged palpi may be noticed the reduction of the orbital cilia. Of the other genera, the males of *Diostracus* alone have the palpi longer than those of the females. Should *philtrum* conform with the rule in this family what a remarkable animal the female must be! But it is far more likely that this secondary sexual character is not repeated in the other sex, and that when the female is discovered she will present no characters at variance with typical *Chrysotus*. It is greatly to be desired that the courtship-habits of these species with enlarged mouth-parts be made known, and especially of this form which has the accompanying allurement of tarsal ornamentation.

A Glimpse of the Life History of Mutilla vesta Cresson.

[Contributions from the Zoological Laboratory of the University of Texas, No. 44.]

By Augusta Rucker.

So little has been made known, at least in America, concerning the habits of the Mutillidæ, that it seems worth while to record the following fragmentary observations made in Austin during the latter part of July on one of the commoner Texan species. Miss Margaret Holliday and myself had been experimenting with some Agricultural ants (*Pogonomyrmex barbatus* Smith, var. *molefaciens* Buckley), and we were endeavoring to obtain a suitable animal food for a queenless colony, which invariably after depositing their unfertilized eggs, resorted to the cannibalistic practice of devouring their larvæ after they had hatched and had been cared for till they were nearly ready to pupate. In our efforts to repress this destructive practice, I placed in a large control nest which had previously been stored with various seeds and freshly killed flies, a larva and pupa of the blue mud-dauber (*Pelopaeus caeruleus*). The ants immediately deserted all other food, showing a decided preference for the newly introduced masses of proteid and fat. This preference did not come merely with a change of diet as often happens with these insects, but continued as long as the young of *Pelopaeus* were

introduced. It was while attempting to procure such succulent morsels that I happened to make the observation I am about to record. I had removed a one chambered mud-nest of *Pelopaeus* [the nest probably belonged to the blue mud-dauber (*P. caeruleus* Lin.) which was the most common form in the neighborhood, though *P. cementarium* Drury was sometimes met with] from a protected portion of the north wall of a stone house, and on opening the sealed receptacle I did not find, as I had expected, a larva surrounded by its paralyzed prey nor a pupa beginning to show the definite shape of the parent form, but instead a densely woven grey cocoon which fitted snugly against the concave wall. When with difficulty I tore open the tough cocoon in order to see its contents, there fell from it a full grown female *Mutilla vesta*. It was evident that the egg of the *Mutilla* had been placed by some unknown means in the mud-dauber's nest and had there hatched out. The larva having consumed the stored up spiders and the larva of *Pelopaeus*, had completed its growth and spun its cocoon in the mud-cell of its host, and was awaiting the time when it should emerge as a perfect *Mutilla*.

Mutillidae in Texas are always found running on the surface of the ground or rarely climbing the stems of low plants. In the case above considered, the mother Mutillid, in order to place her eggs in the *Pelopaeus* nest, was forced to leave the ground and creep up a rough stone wall for a vertical distance of about ten feet where the nest was situated. If *Pelopaeus* is the normal host of *M. vesta*, the latter undoubtedly has more difficulties to surmount than does her European sister, *M. europoea*, which is said to live in the nest of *Bombus agrorum* and to deposit her egg in the growing *Bombus* larva by means of her ovipositor which she thrusts through the aperture made in the wall of the cell by the worker *Bombus* for the purpose of passing in food. It does not seem possible that the female *Mutilla vesta*, in the act of ovipositing could have perforated the hard mud wall of the cell in order to place her egg in the contained larva; but it seems probable that the egg was deposited by her among the earliest spiders stored and before the *Pelopaeus* had laid her own egg and sealed the chamber. Further

observations will have to be made to determine the exact way in which the wingless female accomplishes such a difficult task, yet the fact remains that the task was accomplished since a pupating Mutillid was found in a sealed mud-dauber's nest.

An attempt to solve this enigma met with no success during the past summer owing to an unusual scarcity of mud chambers. The moist plastic clay used as building material by the *Pelopaeus* was very scarce on account of a protracted drought and this appeared to affect the habits of the host in a manner so interesting as to be worth mentioning. The few nests found never contained more than two chambers, and the majority of these were deserted, unfilled and unsealed. Of those that were sealed very few were well filled with the various species of spiders which are taken under ordinary circumstances. At first I could not account for this destitute condition of the mud houses since it seemed a most propitious year for spiders, they being in evidence on all sides. The only explanation that occurred to me was that a relatively definite amount of muscular energy was consumed by the mud-dauber under favorable conditions in carrying out her house-building and storing instincts. With unfavorable conditions this definite amount of energy was consumed in the displaying of the instinct which came first, that of nest building. It does not seem to be necessary to consider the question of intelligence since the mud-daubers through change of environment were offered every opportunity for adaptation. Whatever may be the true explanation, the fact remains that in October on my return to Austin, I was unable to find a single mud-dauber's nest in places where they had always been found in such abundance as to be considered nuisances. The ceilings of verandas and the walls, furniture and books in rooms unused throughout the summer which had been selected heretofore by *Pelopaeus* as foundations for nests were all bare.

SOMATOCHLORA PROVOCANS.—The species described under this name in the NEWS for February, page 39, is the same species as "Somatochlora sp. near forcipata Scud." of my list of New Jersey Odonata of 1900 (27th Ann. Rep. N. J. St. Board. Agric., Suppl., p. 72, where, however, the date is incorrectly given as Aug. 30, '92, instead of July 22, '92).—P. P. CALVERT.

A New Genus of Solpugida.

By Nathan Banks.

Dr. Harold Heath, of Stanford Jr. Univ., has recently sent me an interesting new Solpugid from California that will not fit any of the known genera of this order. It differs markedly from the two genera that were previously known from this country, both in structure and in habits. By its structure it is probably nearest allied to *Ammotrecha*, but its diurnal habit reminds one of certain South African forms.

HEMEROTRECHA n. gen.

The male has an elongate flagellum consisting of two pieces lying along the inner side of the upper finger; upper finger (of ♂) without teeth; lower finger (of ♂) with several teeth on basal half; front margin of cephalothorax truncate; tarsi

Jaw of *Hemerotrecha*.

II. and III. of one joint; tarsus IV. of three joints, the middle one very short, all with large claws. Palpi short and stout, a few spines below on tibia and metatarsus. There are no series of spines above on metatarsi II. and III.

This genus differs from *Ammotrecha* by the truncate front margin of the head, by the untoothed upper finger of male mandibles, and by the very elongate flagellum. It differs from *Gluvia* in the shape and position of the flagellum. The

three-jointed hind tarsi will separate it from *Mummicia* (the male of which is unknown).

Hemerotrecha californica n. sp. Head, mandibles, and palpi pale reddish; the tarsi and the greater part of metatarsi of the latter blackish; eyes on a black spot; legs brown, the first pair reddish on basal joints: abdomen and posterior segments of the thorax blackish, tinged a little with purple. Mandibles as long as the cephalothorax, their basal parts above and on the outer side beset with numerous stout spines, longer bristles and spines near the base of the upper finger; the inner side of the mandibles near the fond with long bristles and feathered hairs; on the inner side of the upper finger (of ♂) is the long and slender flagellum of two pieces lying alongside the finger. The upper finger (of ♂) is as long as the basal part of the mandible, quite straight, but bent down at tip, and without teeth. The lower finger is not quite as long as the upper; on the basal half are four teeth, the end ones quite large, the two middle ones much smaller; beyond these teeth the edge of the finger is distinctly although finely serrate. There is one large and several small teeth on the fond of the mandibles. The palpi are quite short, and stout, not tapering; they are very hairy, and the tibia and metatarsus have each two spines on the lower inner side and one or two beneath; there are no papillæ. The legs are slender, the hind pair longer than usual; they are all very hairy; the hind tarsi are slightly covered; the hind tibia has above at its base one, and at tip two tactile hairs, each as long as the joint. The abdomen is about twice as long as the cephalothorax, and moderately slender.

I have not seen an adult female. Length, 10 mm. Found near Pacific Grove, California, by Dr. Harold Heath, who says that they run about in the blazing hot sunshine.

Studies of Texan Bees.*

PART I.

By Charles Thomas Brues.

EPEOLUS.

This genus is very well represented in the Texan fauna, its numerous and somewhat variable species being quite difficult to separate. The following dichotomy will serve to identify them with tolerable certainty.

Legs and antennal scape wholly black 2
Legs and scape more or less ferruginous 4
2. Mesonotum with two short buff lines on anterior middle.
1 *lunatus* Say ♂
Mesonotum with a wide crossband of light yellow anteriorly 3

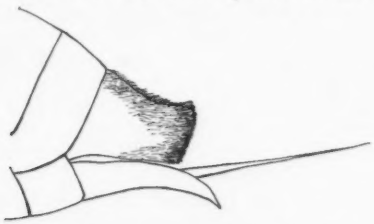
* Contributions from the Zoological Laboratory of the University of Texas. No. 41.

3. Third submarginal cell wider above than distance from base of third submarginal to second recurrent nervure along cubital nervure, last ventral segment of female normal . . . 2 *remigatus* Say.
Third submarginal as wide above as distance from second recurrent nervure to base of cell below, last ventral of female prolonged and concave. . . . . 3 *concavus* Cress.
4. Lateral teeth of scutellum well developed, last ventral segment of female not longitudinally concave 5
Lateral teeth of scutellum in male obsolete, the scutellum simply lobed at the sides, last ventral segment of female recurved and longitudinally concave . . . . . 4 *penicilliferus* sp. nov.
5. First abdominal segment with a broad median crossband, second with a narrow apical band, third and following segments black, wings dark . . . . . 5 *bifasciatus* Cress.
Abdomen not so marked 6
6. Spurs of four posterior tibiæ ferruginous, concolorous with the tibiæ . 8
Spurs of four posterior tibiæ black 7
7. Scutellar teeth ferruginous. 13
Scutellar teeth black 9
8. Small, less than 9 mm., abdomen subglobose, black on first abdominal segment much attenuated laterally . . . . 6 *compactus* Cress.
Larger, about 11 mm., abdomen elongate, the fifth segment of female abdomen without a roughened hairy space, black on first segment a wide squarely truncate transverse band.
7a. *scelestus*, var *tubercularis* var. nov.
9. Fifth abdominal segment of female at the tip not more coarsely sculptured than the remainder of the segment . . 7 *scelestus* Cress.
Fifth abdominal segment of female with the usual rough hairy space. 10.
10. Legs, except coxæ, ferruginous, wings hyaline, darker at tip.. . . 11.
Femora more or less black, wings pale fuliginous in female, lighter in male. . . . . 8. *mercatus* Fabr.
11. First abdominal segment wholly buff except for a very slender black longitudinal line which is more or less dilated at its middle into a punctiform spot . . . . . 9. *quadrifasciatus* Say.
First abdominal segment with a large black space . . . . . 12.
12. Black on first abdominal segment triangular, attenuated laterally. 10. *texanus* Cress.
A broad transverse black band on first segment, not triangular. 11. *occidentalis* Cress.
Black on first segment more broadly triangular than *texanus* and legs darker. . . . . 12. *lunatus* Say ♀.
13. Scutellar teeth long incurved, two spots on scutellum, anterior lateral corners of mesonotum and tubercles ferruginous. 13. *bardus* Cress.
Scutellar teeth triangular when seen from above, remainder of scutellum and mesonotum black . . . . . 14. *pusillus* Cress.

E. nigriceps Sm. could not be inserted in the table from the description. Its habitat is given by Smith (New Species of Hymenoptera in the British Museum, 1879, p. 103) as Texas and California. It is apparently near to *E. remigatus*.

Epeolus concavus Cress. (Fig. 1.)

In the female of this species the apex of the abdomen presents characters resembling those of *penicilliferus* but quite different from those of any other species we have seen. The



Epeolus concavus Cress. Apex of abdomen ♀.

fifth dorsal segment is almost squarely truncate behind. This appearance is partly produced by a dense brush of silvery or golden tipped, dark hairs, all of which terminate together to form a flat surface. The concave ventral plate is also peculiar to these two species.

The male greatly resembles *remigatus* but differs in having the sixth segment black, without a pale apical band.

Epeolus penicilliferus sp. nov.—*Female.* Length 15 mm.—Large and stout; black. Face, clypeus, vertex and posterior margin of head above covered with light ochraceous pubescence, lightest below on the clypeus. Broad posterior margin of prothorax; posterior margin of mesothorax, extending forward along the sides nearly to tegulæ; two very distinct oval bands on anterior middle; large spot on pleura covering tubercles; middle of anterior border of scutellum; posterior margin; post-scutellum and two oval spots on metathorax, covered by dense appressed light buff pubescence. Four posterior coxæ with a silvery spot externally. Abdomen broad, oval. First segment with its basal half, except basal black spot, and rather wide posterior and wide lateral margins, light buff. The central black band nearly four times as long as wide, its edges parallel, the ends obliquely truncate. Second, third and fourth segments with broad posterior bands growing lighter posteriorly. The one on the second confluent with a large nearly quadrate lateral spot of same color. Band on third segment slightly swollen laterally. Abdomen elsewhere, except apical segment, deep velvety black.

Labrum, mandibles except tips and clypeus ferruginous, the latter with large lateral foveæ, punctures fine interspersed with very coarse ones. Antennæ with first three joints and base of fourth ferruginous. Vertex closely, coarsely punctured. Mesothorax coarsely and somewhat irregularly punctured. Tubercles, tegulæ, coxæ and legs ferruginous. Spurs of four posterior tibiæ deep black. Legs somewhat silvery pubescent. Scutellum lobed behind, lateral teeth small, blunt, almost obsolete. A bunch of white hairs at base of hind wings. Apical dorsal segment of abdomen dark fuscous with very coarse punctures medially, from which arise a dense brush of stiff fuscous hairs which is truncate, causing the segment to appear obliquely truncate at an angle of 45°, tips of hairs silvery. Venter more or less ferruginous posteriorly, cinereous bands on second to fourth segments. Ventral plate longitudinally concave and recurved at tip. Wings light fuscous, nervures piceous.

Male. Length 13-16 mm.—Much more slender than female. Face densely silvery. Underside, especially of thorax silvery. Spots on coxæ larger. Legs more silvery and pleura completely covered with buff pubescence. Scutellar teeth obsolete. Abdomen with bands on fifth and sixth segments, all the bands narrower than in the female. Pygidium piceous. Venter with a fringe of recurved white to brownish hairs on fourth and fifth segments, also a slight silvery one on the third. Wings nearly hyaline, not darker apically.

Numerous specimens ♂ ♀ Austin (Brues) and Fedor (Birkmann).

This is a very distinct species. The female resembles *concavus* Cress. in the sexual characters and is evidently related to that species. The ventral plates are nearly identical, the dorsal brush is obliquely instead of squarely truncate. The ornamentation, wings and legs are however entirely different and the males are totally unlike.

Epeolus bardus Cress.

We have not seen any specimens of this species from Texas, although the type was from that State. Some specimens which we collected at Meredosia, Ill., agree perfectly with Cresson's description.

Epeolus scelestus, var. **tuberculariis,** nov.

One specimen from Austin differs from the typical *scelestus* in having ferruginous tubercles and tibial spurs, and in having the second, third and fourth ventral segments cinereous on the posterior margin. The pygidium is silvery at tip and the short lines on the mesonotum are almost confluent. As we have only

one specimen, it is not possible to decide if this form be worthy of specific rank.

Epeolus pusillus Cress.

This species is fairly common in the locality of Austin, especially upon the arid slopes of the hills. It ranges from Massachusetts to Texas, and is a very constant and sharply defined species, as specimens from Austin are exactly similar to ones collected at Woods Hole, Mass.

CŒLIOXYS ♀ ♀.

Femora and tibiæ red. . . . . 2.
Femora and tibiæ black, tarsi ferruginous, apical dorsal plate of ♀ suddenly constricted at middle and angled at the sides.
1. *rufitarsis* Sm.
2. Basal segment of abdomen ferruginous, dorsal abdominal segments sparsely punctured on middle, venter ferruginous.
2. *menthæ* Ckll.
Abdomen black above . . . . . 3.
3. Clypeus emarginate. . . . . 3. *Sayi* Robt.
Clypeus not emarginate . . . . . 4.
4. Four posterior tarsi wholly black, with yellow hairs, coxæ red, length about 13 mm. . . . . 4. *texana* Cress.
Tarsi ferruginous, often darker at tips. . . . . 5.
5. Apex of apical dorsal plate of ♀ acute or obtusely pointed. . . . . 6.
Apex of apical segment rounded, the plate much constricted at the middle. . . . . 5. *8-dentata* Say.
6. Apical ventral plate of ♀ obtusely pointed at tip . . . 6. *insita* Cress.
Apical ventral plate rounded at tip, with an appendage at apex, sides sub-parallel. . . . . 7. *scitula* Cress.

Cœlioxys menthæ Ckll.

A male collected by us at Galveston, Tex., upon the flowers of *Monarda* sp. (?) agrees perfectly with Cockerell's original description. This is a case of a typical New Mexican species extending into the coast region of Texas.

Cœlioxys Sayi Robt.

This species is widely distributed, occurring from Chicago, Ill., to New Mexico.

Cœlioxys edita Cress.

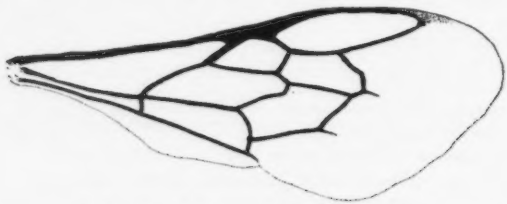
We have seen no female specimens of this species, and hence could not include it in the table.

Melanostelis.

The species described below seems to belong to *melanostelis* Ashmead, although the characters of the apex of the abdomen are very different from those of the male. It is related to *Stelis* (?) *nitida* and *S.* (?) *monticola* of Cresson.

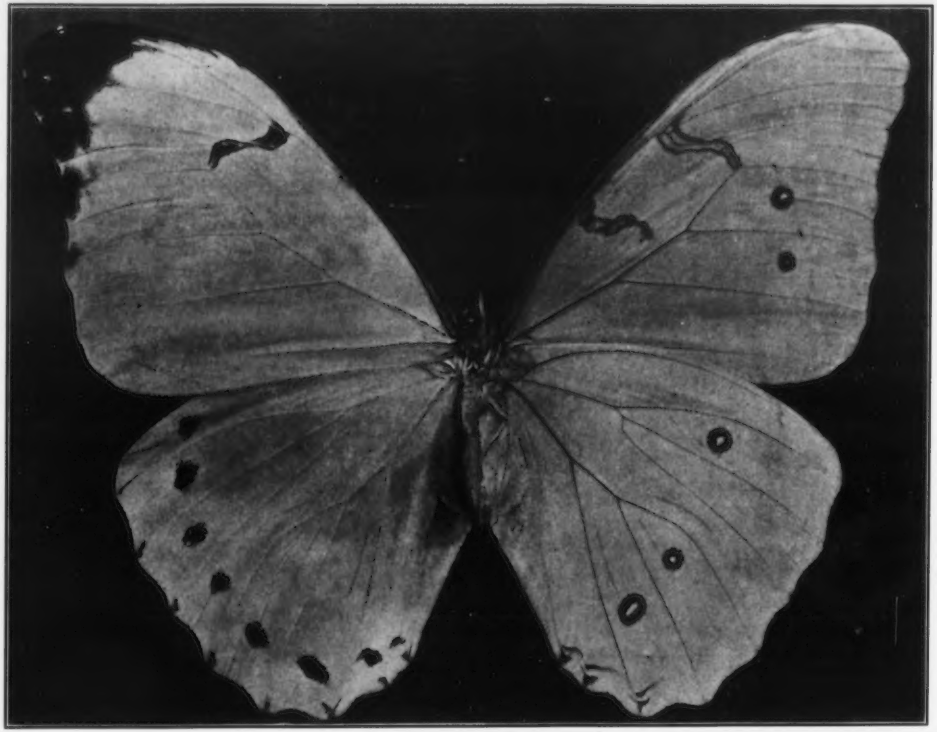
MELANOSTELIS. (Fig. 2.)

Melanostelis nyssonoides sp. nov. *Female.* Length 7 mm.—Shining black; densely, coarsely punctured. Marked with light yellow as follows: narrow anterior orbits from near base of mandibles to above antennæ; spot above eyes near posterior margin of head; two small lateral spots on anterior edge of mesothorax; four widely separated elongate spots, forming an interrupted sub-apical band on first segment of abdomen, the lateral ones largest; similar spots on second segment, but more elongate on middle and smaller laterally; four similarly placed subquadrate spots on third segment; fourth segment with two small lateral subapical spots.



Forewing of *Melanostelis nyssonoides* sp. nov.

Tibial spurs and spot on posterior tibiæ externally at base also yellow. Face rather densely clothed with moderately long white pubescence, which becomes sparse above antennæ and is nearly absent on vertex. Cheeks and head behind eyes clothed like face. Mesothorax sparsely white hairy, pleura densely so, under side of thorax densely, legs sparsely. Abdomen with apical bands of stiff white hairs directed backwards and dilated into spots laterally on first five segments, more prominent on basal segments. Ventral segments except last with apical bands of stiff white hairs. Mandibles tridentate, the anterior tooth long acute, others not very distinct; black, banded with ferruginous near tip. Clypeus truncate, the hairs on its margin light golden. Antennæ black at base, slightly piceous at tip. Head very coarsely punctured, confluently so in front of ocelli. Mesonotum and scutella somewhat less coarsely punctured than head. Scutellum not armed. Tegulæ black, rather finely punctured; meso-pleura very coarsely punctured, metapleura more finely. Posterior face of metathorax brilliantly polished, with a few scattered white hairs and large punctures laterally. Base of first abdominal segment also polished, concave and with scattered punctures. Abdomen



UPPERSIDE. UNDERSIDE.

MORPHO THOOSA (SMYTH).

elongate, widest at second segment and strongly narrowed posteriorly almost pointed; densely punctured like thorax, the punctures larger apically. Each segment having a very narrow posterior, smooth, depressed ferruginous border; which is partly concealed by the hair bands which extend over it. Apical segment with oblique sides and subtruncate apex. Ventral surface of abdomen coarsely punctured at base, finely at apex. Last ventral broadly rounded and emarginate. Legs black, coarsely punctured, tarsi piceous. Middle tibiæ with one spur and bispinose outwardly at tip. Wings nearly hyaline, nervures black. Marginal cell as long as first discoidal, rounded at tip, where it is not contiguous with costal margin; bearing a very weak appendage at tip. Second submarginal cell one-half longer than first, narrowed nearly one-half toward marginal, and receiving the recurrent nervures at its basal fourth and apical fifth. Posterior wings hyaline, nervures piceous.

Described from a female specimen collected at Austin, Tex., May 18, 1900. It greatly resembles in form and character of markings certain species of wasps of the genus *Nysson*.

Morpho Thoosa (sp. nov.).

Description of a new variety of Morpho polyphemus Dby. Hew. from Mexico.

By Ellison A. Smyth, Jr.

Va. Polytechnic Institute: Blacksburg, Va.

Extent five and three-sixteenth inches: general color and markings as in *M. polyphemus*, of which it is possibly a coast variety.

Upper surface: Satiny white, with a pearly lustre noticeably greener than in *polyphemus* and the forewings fuller in outline; apex, to depth of half an inch blackish-brown; this color extends one and one-eighth inches along costal margin, and one and three-eighth inches along external margin where it ends in two spots; costal margin from base of wing to end of cell, brown; extremity of cell crossed by the usual black bar following and covering the disco-cellular nervules, wider and darker than the maximum in *polyphemus*. Hind wings with extremities of nervules lined in black, forming a series of marginal dashes; a submarginal row of larger, rounded spots (not lunulate as in *polyphemus*) in the internervular spaces, about three-eighths of an inch from margin. Anal angle lacks the buff spot constant in *polyphemus*.

Under surface: The dark apical border of forewings shows faintly through, being distinct only at marginal endings of subcostal and discoidal nervules; a faint brown bar crosses end of cell, lighter in its centre, and a brown curved bar through middle of cell, from subcostal to median nerves (this is sometimes absent in *polyphemus*, though dis-

tinct and strong in the variety *luna*) a faint spot between the two discoidal nervules, representing the four-ringed ocellus of *polyphemus;* space between lower discoidal and upper median nervules bare (here *polyphemus* usually has an ocellus); the two ocelli between upper and middle, and middle and lower median nervules are small, only three millimetres in diameter (in *polyphemus* they are about six millimetres), and consist of a white centre surrounded by black with faint trace of a yellow surrounding wing; in *polyphemus* the large distinct ocelli consist of a white centre (often a strong bar) deeply surrounded by black enclosed in a yellow ring strongly circled by a black, sharp-edged ring. I have never seen *polyphemus* with less than three well-marked ocelli in forewing, and there are usually four.

Inferior wings show faintly the shadow of the submarginal dark spots, and the anal angle has three marginal lunules surmounted by a faint submarginal line extending over only two spaces; only three ocelli in each wing, namely, between the two sub-costal nervules and between upper and middle, and middle and inner median nervules; anal ocellus totally wanting. *Polyphemus* has six, and rarely seven ocelli, beginning with space between subcostal nervules and ending with space between inner median nervule and submedian nervure at anal angle, in which latter space there are occasionally two ocelli. The largest ocelli in *thoosa* are about half the size of largest in *polyphemus*, contain less black and are less distinct. Rest of hind wing immaculate, lacking all trace of the numerous faint lines found in *polyphemus* and which are so suffused and marked in var. *luna*.

I have compared one hundred and twenty-six specimens of *Morpho polyphemus*, mostly from Cuernavaca, Mexico, of which fifteen are var. *luna;* among these were twenty-one females. In only four of the whole number was there any obsolescence, and never an absence, of the two middle ocelli wanting in hind wings of *thoosa*, and the anal ocellus was in all large and distinct and occasionally accompanied by an additional small ocellus; a few specimens of *polyphemus* showed double pupils, indicating an increase of ocelli, and where *polyphemus* shows any obsolescence of ocelli in hind wings the lower two in fore wings are especially large and full; no specimen showed any transition to the deep black border of apex so pronounced in *thoosa*, though each had a few dark lines in apex, not shown in Doubleday-Hewitson's figure.

The maximum extent of the *polyphemus* and *M.* var. *luna* compare with *M.* var. *thoosa* as follows (in inches):

	♂	♀
M. polyphemus,	4¾	5½
var. *luna*,	4¾	5⅝
var. *thoosa*,	5 3/16	?

As yet I have no female of *thoosa*.

Sum of distinctive characters of *M. thoosa*, as compared with *M. polyphemus*. Larger size; greenish tinge; strong, deep, black apex of forewing; great reduction in size and number of ocelli on under surface; immaculate under surface of hind wings.

Described and figured from a male, one of a number taken at San Juan Evangelista, Vera Cruz Province, Mexico, and sent to me by Mr. E. K. Harvey, of Los Angeles, Cal. *Thoosa* is probably only a variety of *polyphemus*, but it seems more worthy of a varietal name than var. *luna*, being more distinct in appearance, and not intergrading, as does *luna*, besides coming from the Eastern Coast of Mexico, while *luna* flies with *polyphemus* in the Central and Western parts. I well know that among the Satyridæ and allied families the ocelli show a great tendency to vary in size and number and I do not base my claims upon this point; but I do claim that *Satyrus alope* and *pegala*, *Morpho polyphemus* and var. *luna*, and many others, are respectively no more distinct than *M. polyphemus* and *M. thoosa*. Mr. Otis W. Barrett during a collecting experience of a number of years near Cuernavaca and Tacubaya, Mexico, never saw this form, though he took *polyphemus* and *luna* in numbers. *Thoosa* seems confined to the coast region from Vera Cruz Province, South, while the other two seem to belong to the Central and Western part of Southern Mexico and south into Central America (?).

It appears desirable at first to name this variety in honor of Mr. Harvey, who captured them, but it is perhaps better to give a name which suggests affinities; and so I have chosen *thoosa* to represent the relationship to *polyphemus*, that Cyclops being the son of Thoosa and Neptune. The name has been used twice already, but applied to representatives of widely remote families, and in each case is a synonym; thus *Euploea thoosa* Hubn. is *E. rhadamanthus* Fabr. and *Anthocaris thoosa* Scud. is a female of *A. Sara* Bdl. *Morpho polyphemus* Dby.-Hew. shares its specific name with a *Maniola*, an *Euptychia* (Satyridæ), two Lycaenas and a Saturnian; and besides *Morpho luna* Butl. we have *Pierella luna* L. (a Satyrid) and *Actias luna* L.

Polyphemus and its allies belong to the Laertes group of the genus *Morpho* containing the following known forms:

1. *Morpho laertes* Dru. Rio Janeiro.
   var. *iphitus* Feld. Locality unknown; described in Reise Novara Lep. III, p. 457, n. 761; and seems, as indicated there, a variety of *laertes*, or of *epistrophis*.
2. *Morpho epistrophis* Hübn. So. Brazil and Uruguay.
   (*catenarius* Perry).
3. *Morpho polyphemus* Dby.-Hew. Central and West Mexico and Central America.
   var. *luna* Butl. ibid.
   var. *thoosa* Smyth. Vera Cruz; East Coast Mexico.

ENTOMOLOGICAL NEWS.

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To Contributors.—All contributions will be considered and passed upon at our earliest convenience, and, as far as may be, will be published according to date of reception. ENTOMOLOGICAL NEWS has reached a circulation, both in numbers and circumference, as to make it necessary to put "copy" into the hands of the printer, for each number, three weeks before date of issue. This should be remembered in sending special or important matter for a certain issue. Twenty-five "extras," without change in form, will be given free, when they are wanted; and this should be so stated on the MS., along with the number desired. The receipt of all papers will be acknowledged.—ED.

PHILADELPHIA, PA., MARCH, 1903.

DR. DYAR'S new list (A List of North American Lepidoptera and Key to the Literature of this Order of Insects, by Harrison G. Dyar, United States National Museum, assisted by C. H. Fernald, Ph. D., the late Rev. George D. Hulst and August Busck. Bulletin of the United States National Museum, No. 52) is out and may be obtained from the author. If unknown to him a statement giving the reasons why a person applying should receive the work will be necessary as the edition is not infinite, and it should reach those who need it most. We have received this work too late for review in this number. It is a very important and valuable contribution to the subject under consideration.

Notes and News.

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE.

WE HAVE received a post-office money order from Ottawa, Canada, with a blank subscription blank in it. Who are you?

THE Annual Dinner of the New York Entomological Society was held at the Hotel Endicott on Jan. 24th. The meeting and the banquet were greatly enjoyed by the members and the guests of the Society. The

after-dinner speeches were listened to attentively, and altogether the affair was a great success. The following persons were present: C. H. Roberts, C. F. Groth, F. E. Watson, C. Schaeffer, H. C. Bumbus, C. H. Sunderland, W. G. Johnson, E. D. Harris, C. M. Myers, E. L. Dickerson, C. W. Leng, C. J. Martin, G. B. Howard, J. B. Pratt, William Martin, L. O. Howard, W. T. Davis, J. B. de la Torre Bueno, G. Franck, L. H. Joutel, H. G. Barber, J. Doll, F. L. Graef, R. F. Pearsall, E. B. Southwick, C. E. Snyder, H. F. Kudlich, L. T. Muench, E. Daecke, R. Ottolengui, A. C. Weeks, W. Beutenmuller, C. Palm, G. Beyer, E. A. Bischoff, H. W. Wenzel, Henry Skinner, E. P. Felt.

Beetle Prizes at Springfield, Mass.—The prizes offered, early in the spring, for the best collection of beetles by children below high school grade, were awarded 17th December. To stimulate observation, those species which were found feeding, and with which a pressed leaf of the food plant was turned in, scored five points, while all other species counted one point each. The first prize of $10 was won by Faunce Dumbleton, with 202 species and 28 food-plant records. Miss Josephine de Montigny carried off the second prize of $5 with 196 species and 18 food plants. Of especial interest is the discovery of this miss of 12, afterwards verified by the writer, of the food-plant of *Plagiodera viridis*. The beetles and their larvæ were found in great abundance upon water-cress (*Nasturtium officinale*).*

There were only ten contestants in all, a very small number, in view of the population of the city. In a slight measure this may be due to unfamiliarity of city children with natural objects, but perhaps it was also due to failure on the part of some of the teachers to properly announce the prize offers. However the results of this contest were quite satisfactory. In spite of a very unfavorable season and the fact that the children had to do most of their collecting in vacation time, over 1800 beetles were collected—of course many of them duplicates. Quite a number of varieties were taken, and a number of species added to our faunal list. The minute species cannot be determined at present, but I will mention a few of the more conspicuous. *Calasoma frigidum*, a species quite common in eastern Massachusetts, but not before recorded from this part of the state. *Lebia fuscata* Dej., is also new for this region, likewise a Cerambycid which, in the absence of a good series for comparison, I assign with slight hesitation to *Acmæops proteus*. A number of other species, not before taken about Springfield, are still undetermined. Among those considered good captures here, though some of them may be abundant elsewhere, are the following:

Calosoma scrutator, *C. wilcoxii*, *Agabus erythopterus*, *Graphoderes*

* Doubtless this beetle is also found, at least in the adult form, on other Cruciferæ, as stated by Mr. Ulke in his recently published list of coleoptera of the District of Columbia.

cinereus, *Cybister fimbriolatus*, *Adalia frigida var. parvula* Weise, *Mysia pullata*, *Podabrus diadema*, *Ludius abruptus*, *Buprestis lineata*, *Geotrupes blackburnii*, *Hoplia* sp. indet., *Diplotaxis tristis*, *Polyphylla variolosa*, *Calloides nobilis*, *Clytanthus ruricola*, *Acanthoderes decipiens*, *Tetraopes canteriator*, *Donacia harrisii*, *Bassareus formosus*, *Microrhopala xerene*, *M. porcata*, *Corphyra elegans*.

Collectors may be interested in the fact that *Tetraopes canteriator* is fairly abundant hereabouts, though rather local. *Adalia frigida*, which seems to be a desideratum with many collectors, is also met frequently, but never, in my experience, gregarious like the common *Adalia bipunctata*. There will be prizes offered by the Natural History Museum for other entomological subjects the coming season.—FREDERICK KNAB.

TROPICAL BUTTERFLIES.—Judging from Mr. W. D. Denton's criticism (in Dec. NEWS) on "Cheap Tropical American Butterflies" which appeared in the October NEWS, it seems that he failed to grasp the purport of my article. I merely endeavored to show that certain species which inhabit "clearings" are always sold at low prices because said species are most readily taken by the average collector and are, for some nine months of the year, quite abundant. I do not doubt Mr. Denton's statement that butterflies are, as a general thing, scarce in Colombia; and while Bates found the Amazon River a rather "dry proposition," we see no reason for discrediting the statement that some thirty species of *Papilio* inhabit the back yards of the houses in northeastern Brazil.

Very naturally a collector may find two "flies" in a New England pasture, as a general thing, to every one in a virgin tropical forest or in a tropical desert or even coast plain. But that is not the question at all. I said that it is "a wonder that the cheap species are not cheaper," and will stand by that statement.

The dealer is not to be blamed for his "bull" policy; he must hold up the price of *Anartias*, *Pierids*, etc., for the "looks of it," because the average amateur might not understand why one species should be listed at two cents while a less "showy" one was held at half a dollar. Indeed, some say it is better to destroy the very cheap "flies" than to "demoralize" the price-list by offering them at their intrinsic value.

Mr. Denton adds that in the Tropics "one seldom sees ragged, worn-out specimens." From my own three years' experience and from that of the seven field collectors whose catches I marketed, I calculated that 25 % of the netted material were good, 50 % were passable, and 25 % were "dangerous to handle" even if thrown in gratis; this, of course, does not take account of the swarms of tattered and faded specimens upon which the experienced netter never wastes a "strike." And the perfect specimen suitable for a "Denton Mount" in a museum "show" cabinet is fully as rare in the Tropics as in the North.—O. W. BARRETT, Mayaguez, Porto Rico.

Entomological Literature.

FIVE Years' Observation and Experiments (1896-1901) on the Bionomics of South African Insects, chiefly directed to the Investigation of Mimicry and Warning Colours, by GUY A. K. MARSHALL. With a Discussion of the Results and Other Subjects suggested by them by EDWARD B. POULTON, Hope Professor of Zoology in the University of Oxford; and an Appendix containing descriptions of New Species by ERNEST E. AUSTEN, WILLIAM L. DISTANT, Col. CHARLES T. BINGHAM, GUY A. K. MARSHALL and JULES BOURGEOIS. Trans. Entom. Soc. London, 1902, pt. iii, pp. 287-584, pls. ix-xxiii. Nov 17, 1902.

This "memoir has been written upon and around the great mass of valuable material supplied by Mr. Guy A. K. Marshall's observations, experiments and captures from 1896 to 1901. So far as this material consists of specimens it is open to the study and criticism of all naturalists; for it has been placed by the generosity of Mr. Marshall in the bionomic series of the Hope Department in the Oxford University Museum. . . . The first part of the . . . work, occupying just half of it, deals with the experiments and observations upon insectivorous animals, and the conclusions and considerations arising out of this work. The experiments on Mantidæ, Kestrels and Baboons will be found to be especially numerous and important.

"A table shows all the examples of Asilidæ and the species forming their prey which could be found recorded or preserved in the British Museum and Hope Collection. The direct and indirect evidence of the attacks of birds on butterflies meets objections which are often raised, and, indeed, nearly the whole of this paper is an effective reply to those who ask for facts rather than hypotheses. One very important side of the work is the employment of Coleoptera on a large scale, and the clear evidence of aposematic* and synaposematic colours in the group. A comparison between the Coleoptera and Lepidoptera in this respect is attempted. The first half of the memoir ends with a section discussing and criticizing the conclusion that there is any great significance or value in human experience of the taste and smell of insects.

"The second half of the work is more heterogeneous. Its first section attempts to supply an interpretation of the startling seasonal phases of butterflies of the genus *Precis*. . . . The remainder of the paper is chiefly devoted to the description of an immense mass of material illustrating mimicry and common warning colours in Rhopalocera, Coleoptera, Hymenoptera, and to a less extent Hemiptera. Many interesting conclusions emerge and are discussed."

Prof. Poulton continues, "I entirely agree with Mr. Marshall's opinion

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* *Aposematic*, referring to "an appearance which warns off enemies because it denotes something unpleasant or dangerous." Poulton, The Colours of Animals, table facing p. 338. 1890.

that an unbiassed consideration of the facts presented in this paper yields a very strong measure of support to the classical theories of Bates, Wallace and Fritz Müller. I would go further and maintain that Mr. Marshall's observations and experiments here recorded place Africa in the first position as the region which supplies stronger evidence than any other of the validity of these theories. But I am even more impressed by the strong support yielded to the modern developments of Fritz Müller's theory of mimicry. Where has Prof. Meldola's Müllerian explanation in 1882 of the common facies of specially protected subfamilies of butterflies received such illustration as in the groups of synaposematic Acræinæ captured in one place and at one time; or the extension in 1887 by the present writer of the same interpretation to the types of insect colour and pattern which are common to a country, received such support as in the marvellous group of Mashonaland insects of many Orders with an appearance founded upon that of the distasteful Coleopterous genus *Lycus?* And the most recent developments of all, the discovery (1894-7) of the principle of 'reciprocal mimicry' or 'diaposematic resemblance,' and of the specially close mimetic resemblance of the females in Müllerian mimicry no less than in Batesian by Dr. Dixey, together with his Müllerian interpretation of resemblances between mimics overlying their resemblance to a common model, all these, founded on the study of Neotropical forms, have supplied the explanation of numerous instances in the Ethiopian region although applied to very different families and subfamilies of butterflies, to Coleoptera as well as to Lepidoptera."

Passing now to some more detailed conclusions, 16 pages recording the results of offering butterflies to Mantids are summarized "that outside the Acræinæ and doubtfully the Danainæ, Mantidæ devour butterflies very freely, the species with warning colours as well as the others, and that they are far more undiscriminating than the majority of vertebrate insect-eaters." The possibility of captivity affecting the acceptance or rejection of food offered is taken into account, but evidence is also adduced that the behaviour of Mantidæ in the wild state "entirely confirms the conclusions to be drawn from Mr. Marshall's experiments."

Twenty-one experiments on offering butterflies to spiders are described; Mr. Marshall is convinced "that both spiders and Mantises have no appreciation of warning colours; and this fact has elucidated another which often puzzled me, I mean the apparently constant correlation between distastefulness and tenacity of life in Lepidoptera. . . . For if my surmise is true, that insectivorous invertebrates are not capable of appreciating warning colors, but have to taste *all* their captives before being able to tell whether they are edible or not (which I think is clear from my experiments), then tenacity of life (as a protective agency) will be as useful an acquisition against invertebrates as warning coloration is against vertebrates, and come into play when the latter is useless. . . . I believe that the toughness of inedible insects has been primarily developed to counteract the injuries from invertebrate foes (which are incapable of

reasoning as to whether an insect is edible or not), and that therein lies its chief utility, though it may prove useful incidentally in other cases . . We see that the insectivorous groups have different tastes, and within each group we must expect to find individual species adapted to feed largely on insects which are as a rule rejected by other members of the same group."

In opposition to the assumption of Haase, evidence is brought forward that "Lepidoptera with warning colours [are] specially liable to the attacks of parasitic insects."

From numerous experiments with Kestrels, three results may be mentioned: inability to seize a large Buprestid beetle, apparently on account of its slipperiness, due to its hard shiny integument and torpedo-like shape;* the rejection, after trial, of the evil-smelling Coræid bug, *Anoplocnemis curvipes* (both Coræid and Buprestid are greedily eaten by baboons, good examples, therefore, of "the difference in value of the same defence with different enemies"); and the continual refusal of a brightly colored grasshopper, which, however, was always eaten "with relish when it had been dipped in meal to obscure its colours." This last case is held to be "almost certainly the result of unpleasant experiences with conspicuously-marked insects, of which a particular instance was afforded when the larvæ of *L*[*imnas*] *chrysippus* was offered. Such association of impressions brought about by very imperfect resemblances are of great importance in helping us to understand the origin of mimicry, both Batesian and Müllerian, in slight accidental resemblances of a very rough and imperfect kind. It also warns us not to regard as far-fetched or absurd those imperfect likenesses which may well be the early stages of incipient mimicry." One would like to know to what extent the meal in which the grasshoppers were dipped determined the "relish."

Tables listing insects found in birds' stomachs are held to "afford wonderfully strong support to the existing theories which explain cryptic† colouring and instinct as the defence of forms which are eagerly sought for as food by numerous enemies, and an aposematic appearance and mode of life as the defence of specially protected forms only attacked under the stress of hunger or by comparatively few specially adapted foes."

Mr. Marshall has some interesting observations and suggestions in the section dealing with the attacks of birds on Lepidoptera—a very vital point in the theory of mimicry. The winter forms of the *Teracoli* are fairly swift fliers, dodging well; if thoroughly frightened, "they settle

* Prof. L. Cuénot made a similar suggestion as to the protective value of the shape and smoothness of the surface of Coccinellidæ. Bull. Soc. Zool. France, 1898.

† *Cryptic* colors, those "which conceal an animal by rendering it difficult to distinguish from some part of its vegetable or mineral environment (in the great majority of cases)." Poulton, The Colours of Animals, table facing p. 338.

with extreme suddenness, and their under-side colouring harmonizes so well with the sandy soil they love that they are very difficult to detect. It seems to me that such a habit can only have been developed for the purpose of escaping from birds, and must be very effectual in most cases. I have noticed that the summer forms, which have not the sandy-coloured under-side do not adopt these tactics, but rely on their flight alone—probably because food is more plentiful for insectivorous birds at that season."

His observations lead him to think that swift-flying butterflies when on the wing are not likely to be caught by birds; the latter learn the futility of pursuit; the butterflies have therefore been able to acquire brilliant colors above, particularly those species having protectively colored under sides. The more frequently observed capture of moths than butterflies by birds does not necessarily imply a preference for the former, but may be due to the relative ease of capture. That birds "have been the chief, if not the only, agents in the production of mimicry, whether Batesian or Müllerian, I have little doubt. It is highly significant that mimicry in its fullest development is only to be found in forest-clad regions where insectivorous birds are most abundant. Moreover, I am not aware of a single instance of true mimicry among species which *habitually* settle on the ground." Nine pages of records of attacks of birds on butterflies in South Africa, India, Ceylon and Burma are given. Indirect evidence of such attacks is also afforded by a collection of these insects bearing injuries, chiefly to the wings, which were probably caused by birds or other enemies, and figured in three of the plates. Injury at the apical angle of one or both fore wings is fairly common. As this angle is very remote from the vital parts, and no great harm to the butterfly is done by such injury, it is suggested that the presence of conspicuous markings, as well as prolongation of its apex at that part of the wing serves as a protection by diverting attack from the vital parts. A similar explanation is offered for the existence of 'eye-spots' and tails near the anal angle of the hind wing

Experiments offering insects to mungooses, a monkey and baboons fill ten pages. As regards the last-named: Coleoptera of the groups Lycidæ, Melyridæ, Cantharidæ and Coccinellidæ were refused without any exceptions, while those belonging to the Rutelidæ, Buprestidæ and Curculionidæ were invariably accepted; the acid secretion of the Carabidæ appeared to be a useful means of defence, especially among the larger species.

There is some interesting evidence of the value of terrifying markings in insects which recalls Prof. Needham's interesting chapter 'Bogus Eyes' in his 'Outdoor Studies.'* In a brief consideration of stridulation as a warning or intimidating character is given a short description of an instrument for investigating such sounds. Evidence and argument are produced to controvert the opinions of Plateau and Wheeler that the

* Outdoor Studies. A reading book of Nature Study. By James G. Needham. American Book Co. 1898.

tasting of insects by man has value as evidence of the likes and dislikes of insect-eating animals.

By breeding the one from the eggs of the other, Mr. Marshall has proved that the butterfly *Precis sesamus* is the widely different dry season form of *P. natalensis*, and *P. simia* the wet phase of *P. antilope*, although absolutely unlike in its coloring. These results naturally suggest that other species of this genus observed only in the wet or in the dry season respectively are similarly related. It is observed that the habits, size, weight, and colors of the seasonal forms, or phases of such species differ greatly in the adult stage although "the larvæ are identical." The dry season phases live in shady places and alight under banks or on rocks, are larger and heavier, sex for sex, than the wet phases, usually have a duller type of coloring on the upper-side, sometimes of quite a different hue, while the under-side more or less resembles a withered leaf. The wet phases live in more open situations and are conspicuously and often brilliantly colored. These differences are in part referred to the fact that in the dry season food for birds and lizards is less abundant and hence the butterflies being more exposed to their attacks have acquired the protective coloring. Prof. Poulton holds that "the dry cryptic phases are ancestral as compared with the conspicuous wet phases," that the latter have been modified out of the former, and that the conspicuousness is a warning coloration associated with a lower degree of palatibility than exists in "an immense number of other species which abound during the wet season in the same stations." *Precis* is not included in Mr. Marshall's list (p. 433) of "the South African genera possessing more or less undoubted distasteful qualities;" of those which are included, none, with the exception of some species of *Acræa*, exhibit any change of color during the dry season which can be construed as protective. "Species of *Precis* entirely restricted to forest regions possess cryptic undersides and habits all the year round, although the dry-season generations are more completely cryptic."

From the extensive section (40 pp.) entitled "Description and discussion of material bearing on mimicry in South African Rhopalocera collected by Guy A. K. Marshall, and the record of observations made by him," by Prof. Poulton, the following may be cited: A given model may be mimicked by species belonging even to three different genera, inhabiting the same locality and flying at the same time.—"A study of mimetic forms may enable us to reconstruct the lost stages through which the older model has passed."—"Mimicry in Lycænidæ and to a less extent in Hesperidæ a character of the Ethiopian region. . . . I can only suggest the possibility that the number of feasible models of moderate and small size furnished by the abundant Acræinæ of Africa may furnish an explanation."—An interesting discussion on whether mimicry in the Nymphalinæ is Batesian or Müllerian.

Warning colors and mimicry (almost wholly Müllerian) are described for many South African Coleoptera. The former are found in carabids

capable of squirting a strongly acid liquid, the latter in the so called "Mutilloid" Carabidæ and Cicindelidæ, where two species of Carabidæ or a species of Carabidæ and one of Cicindelidæ, etc., may resemble the shape and markings of a species of *Mutilla*, all three living in the same locality at the same time. "By far the most complete illustration hitherto known of the power of mimicry to attract all forms irrespective of affinity" is that afforded by the "group with Lycoid markings," 36 species of Coleoptera, Hymenoptera, Hemiptera, Lepidoptera and Diptera of Mashonaland whose brown and orange markings (figured in Plate XVIII) resemble those of seven species of Lycidæ (Coleoptera).

Still another section deals with common warning colors in South African Hymenoptera and the mimicry of them by insects of other orders.

If the notice we have given of this highly interesting and suggestive paper appear to some to be of undue length, our justification may be found in these words of Mr. Marshall in speaking of his experiments: "I feel convinced that were naturalists more ready to carry out extensive experiments of this nature there would be much less of the prevalent *a priori* criticism of these valuable theories [of warning coloration and of mimicry] which throw light upon a vast number of facts which must otherwise remain for us mere meaningless coincidences. It is especially important that experiments should be made by as many different observers as possible, for in this way alone can the errors due to unavoidable personal bias be eliminated; and if the present publication only has the effect of inducing other entomologists in South Africa, or elsewhere, to turn their attention to the interesting problems involved, it will have fully served its purpose."

May many readers of the NEWS be hereafter found among those "other entomologists"! P. P. C.

Doings of Societies.

The February meeting of the Newark Entomological Society was held on the 8th, with President Angelman in the chair and twelve members present.

The minutes of the previous meeting were read and approved. The Treasurer's report showed a balance of $56.11 on hand. The Lecture Committee reported that Prof. Smith's lecture on mosquitoes will be held Friday, February 20th, at the Newark Library's Lecture Room and that 300 invitations were printed.

A motion was made and carried to buy the following books. "Revision of Cicindela," "Revision of the Deltoids" and "Revision of Leucania."

Mr. Dickerson reported the capture of *Sphaeridium scarabaeoides* at Chester, Morris Co., N. J., in September, and at Angelsea in July. Mr. Bischoff reported the capture of the same species at Irvington, N. J., also the capture of *Platydema ellipticum* at Irvington, February 6th.

Mr. J. Grossbeck, of Paterson, was elected a member.

OTTO BUCHHOLZ, *Secretary.*

A meeting of the Chicago Entomological Society was held in the John Crerar Library, Thursday evening, January 15th, 1903. Eight members present. Visitors. Mr. Emil Liljeblad and Mr. Lang. President Longley occupied the chair. A decision of the question of affiliation with the Chicago Academy of Sciences being in order a formal ballot was cast, which resulted in a vote of large majority for the affiliation. It is understood that the Society shall hereafter be called the Entomological Section of the Chicago Academy of Sciences.

It was moved and seconded that necessary officials for the Section be elected. The ballot resulted as follows: *Chairman*, W. E. Longley; *Recorder*, John Comstock; *Honorary Curator*, (it was deemed best to elect a member to this position at some future time); *Executive Committee*, Messrs. Healy, Tower and Kwiat.

The draughting of necessary by-laws and the task of informing the Academy by written communication of developments at this meeting was intrusted to this committee.

Dr. Hancock stated that for historic reasons it would be well not to entirely lose the name of the Chicago Entomological Society, and suggested that we request of the Academy the privilege of retaining the old name in brackets for a time at least.

Mr. Healy's paper on *Satyrus alope*, in its various forms as illustrating climatic variation in races, was to have been read, but through the Secretary's neglecting to announce it on the notices of meeting Mr. Healy had made no preparations. The reading was therefore postponed until May. Adjournment 9.30 P. M.

JOHN COMSTOCK, *Secretary.*

The January meeting of the Feldman Collecting Social was held at the residence of Mr. H. W. Wenzel, 1523 South 13th Street, Philadelphia. Thirteen members were present.

President C. W. Johnson read his annual address, entitled:

Some Remarks on Our Local Fauna.

In the study of the local fauna of a given section there is a certain fascination that leads one on, which is not to be found in any other line of work. This is especially true of Entomology, where in an area of fifty or sixty miles from a given point new forms are constantly being found or the equally interesting discovery of the life-history of the known species. The more carefully we collect and investigate, the more pertinent becomes the old maxim:—"He is a good naturalist who knows the fauna and flora of his own parish."

I may truly say that there is no section of the United States where the insect fauna is perhaps better known than the State of New Jersey. With greatly diversified physical conditions and favorably situated between the great cities of New York and Philadelphia with their corps of active and enthusiastic Entomologists, she has endeared herself to them as the place where they can find all that is likely to be found in this region (and very often a little more). I doubt if a month goes by during the winter, or a week from March to November, or a day during the summer that someone is not in the field. Combined with this, New Jersey has a model State Entomologist who leaves nothing unturned to further the cause of his devoted science.

A feature that has greatly stimulated the study of our local fauna is Prof. Smith's catalogue of the Insects of New Jersey. It is much more than a catalogue, for it tells the two most important facts to the collector; facts that have required years of patient and careful field-work, viz.:—where and when to collect. It forms a basis to work upon, the younger collectors strive to obtain the species recorded, while the older ones endeavor to add to the number of species. It also shows the importance of keeping exact data, and the distribution of species.

Since the publication of the catalogue I have been able thus far to add about 120 species of Diptera; a list of which will be published as soon as the material collected during the past summer has been thoroughly studied. The Hymenoptera and Diptera will yield the greatest number of additional species, and I feel confident in asserting that there are over 2000 species of Diptera within the confines of the State. This estimate is based on a comparative list made of the Diptera of Eastern Pennsylvania. Taking a separate of the New Jersey catalogue, I went over my collection and checked off all those represented from Pennsylvania and inserted all additional species and records; this improvised list shows about 185 not recorded or collected, as far as I know, within the confines of New Jersey, but which will undoubtedly be found, particularly in the more northern part of the State. Thus we have about 1,500 species at present recorded from this section.

It may here be of interest to note in what ratio the number of species differ in a few of the larger and best studied families:—In the Syrphidæ New Jersey has 109 species, of which 24 have not been recorded or collected in Pennsylvania; and Pennsylvania 112, of which 30 have not been recorded from New Jersey. Asilidæ, 57 from New Jersey, of which 14 have not been taken in Pennsylvania and 46 from Pennsylvania, of which 6 have not been recorded from New Jersey. Bombylidæ, 38 from New Jersey and 21 from Pennsylvania, while all but one of the latter have been collected in New Jersey; 17 of those taken in New Jersey have not been recorded from Pennsylvania. The dry sandy region of Southern New Jersey seems especially favorable to many of the species of this family. Tabanidæ, 55 from New Jersey, of which 25 have not been reported from Pennsylvania; 33 from Pennsylvania of which 3 have not been recorded from New Jersey. Leptidæ, 20 from New Jersey, of which 3 have not been recorded from Pennsylvania; and 24 from Pennsylvania of which 8 have not been taken in New Jersey. Tachinidæ, 125 from New Jersey, of which 57 have not been recorded from Pennsylvania; 76 from Pennsylvania of which 15 have not been recorded from New Jersey. The Tachinids should be placed among the families

in which there is still a great deal of work to be done, and while I have carefully collected and studied the New Jersey forms, on the Pennsylvania side the family has been somewhat neglected.

The Muscoidea will still yield a great many additional species; while in the *Tipulidæ*, *Chironomidæ*, *Cecidomyidæ* and *Mycetophilidæ*, probably only about one-half of the species have been collected. In preparing the catalogue of Diptera, the Chironomids furnished 15 new species and since its publication 11 more have been discovered, making 26 new species out of a total of 68. An interesting form allied to the Chironomids and which constitutes the family *Stenoxenidæ* was collected on the New Jersey side of the Delaware Water Gap. The *Mycetophilidæ* show nine new species and one new genus. Prof. Smith has thus far in his investigation of the mosquitos added some 16 species to the *Culicidæ*, two of which were new.

Equally interesting discoveries have been made throughout the entire order; while in the geographical distribution of species we are presented with many surprises. Last May 6th–8th were spent at Atlantic City and vicinity; among other species is one which Mr. Coquillett has compared with his type of *Canace snodgrassi* from the Galapagos Islands, and finds that it "agrees perfectly." On August 12th, at Wildwood I captured two specimens of a West Indian Trypetid, (*Euaresta fucata* Fab.) We may well say, What next?

In some of the other orders I can only give in most cases an approximate number of additional species:—Odonata, 10; Homoptera and Hemiptera, about 25; Orthoptera,8; Coleoptera about 60; Lepidoptera about 40 and Hymenoptera about 50.

Favored with such an excellent record of the insect fauna of this region, it seems very important that it should be kept up by the different specialists, and as soon as the number of additional species will warrant its publication, the results will be brought together as a supplementary catalogue.

Regretting that I will soon have to resign from the Social owing to an engagement in another city, I wish to express my thanks to the members for many pleasant hours and for the honor of having been twice chosen as your President.

Dr. Skinner referred to Mr. Busck's former communication on Clemen's types of Tineidæ, and stated the specimens could not be said to have been lost inasmuch as they have been under his care as Curator of the American Entomological Society for many years. This equally applies to Prof. Smith's statement regarding types of Grote and Robinson.

Prof. Smith stated that while the Grote and Robinson types were preserved yet they were simply labelled "type" and were not named, and were identified by comparison with the published figures.

Dr. Skinner said that the majority of the Grote and Grote and Robinson types had the name of the species, the name or names of the authors and the word type on the pin A number of the species referred to by Prof. Smith were types of synonyms and had simply a printed label "type." Forty or fifty years ago these things were not done as they are to-day.

Mr. H. W. Wenzel referred to the greasy character of cabinet specimens of many sub-aquatic beetles, such as *Donacia*, this usually causing much verdigris around the pin when the insect is mounted. If mounted on paper slips these become soiled. He is now trying slips made of thin celluloid for mounting and he hopes to thereby avoid the disadvantage mentioned. He pointed out that in *Donacia floridæ* the hind femora of the male extend far beyond the elytra, a character which does not exist in any other American species of the genus.

Prof. Smith referred to the President's address and stated that the fauna of even a single plant is much more extensive than may be thought. He instanced the pitcher-plant, in the roots of which the larva of one of the rarest moths, *Hydroecia apassionata*, had been found recently.

He recorded *Culex melanurus* from New Jersey; it passes the winter in the larval stage. He also stated that *Culex nigritula* had been found hibernating in cellars of large factories in Newark, N. J. These had been killed by a fumigation of formaldehyde.

Referring to the President's address Dr. Skinner considered that the comparison of the Pennsylvania and New Jersey faunas was inadequate as far as Pennsylvania is concerned,

inasmuch as the latter was scarcely collected over except in the eastern part, whereas New Jersey had been much more thoroughly investigated. He also referred to the accepted view by army officers that yellow-fever is only contracted by the bite of *Stegomyia fasciata*, yet the epidemic of 1793 in Philadelphia occurred in a region where the insect is absent.

Prof. Smith stated that the unusually dry period then existing would tend to cause streams to form puddles or breeding places for mosquitoes; and that the fever may have been due to another species of mosquito, possibly *Culex triseriatus* which resembles the *Stegomyia* very closely and therefore might be capable of transmitting the disease.

Mr. Johnson stated that he had found *Culex triseriatus* only in puddles.

Mr. H. W. Wenzel pointed out that in 1793 there existed about Philadelphia no doubt many more pools and other breeding places for mosquitoes than at the present day.

The following resolution was ordered incorporated in the minutes:

Resolved, That while the Feldman Social feels that it should congratulate its President, Mr. C. W. Johnson, upon his election to the Curatorship of the Boston Society of Natural History, it does so with regret, because it feels that his departure from Philadelphia will be a distinct loss to Entomology in this city.

Resolved, That we place upon record our sincere regard and esteem for him as a man, as an entomologist and a companion, and bespeak for him all the success in his new field which his abilities deserve.

Resolved, further, That he be placed on the list of the honorary members of this Society.

Mr. Johnson thanked the Society for its kind wishes.

The following officers were elected for the ensuing year: *President*, Mr. Charles Boerner; *Vice-President*, Mr. Erich Daecke; *Secretary*, Mr. Wm. J. Fox; *Treasurer*, Mr. H. W. Wenzel.

WILLIAM J. FOX, *Secretary*.

EXCHANGES.

Not Exceeding Three Lines Free to Subscribers.

☞ These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and only when necessary those at the top (being longest in) are discontinued.

Identification of Insects (Imagos) for Subscribers.

Specimens will be named under the following conditions: 1st, The number of species to be **limited to twenty-five** for each sending; 2d, the sender to pay all expenses of transportation and the insects to become the property of the American Entomological Society; 3d, Each specimen must have a number attached so that the identification may be announced accordingly; 4th, All insects must be mounted. Exotic species named only by special arrangement with the Editor, who should be consulted before specimens are sent. Send a 2-cent stamp with all insects for return of names. **Please put date of capture and exact locality on each specimen.** Before sending insects for identification, read page 41, Vol. III. Address all packages to ENTOMOLOGICAL NEWS, Academy Natural Sciences, Logan Square, Philadelphia, Pa.

I wish to secure, at once, specimens of all forms of *Satyrus alope* and *pegala* from all parts of U. S., accompanied by complete data. Will give good exchange or cash. John L. Healy, 1137 Pratt Ave., Chicago, Ill.

Will exchange California specimens *Attacus ceanothi* cocoons, etc., for flies caught in other places that also inhabit California.—J. E. Cottle, 1520 Pacific Avenue, San Francisco.

Coleoptera.—Gustav Krech, Bartenstein, East Prussia, Germany, wants American Coleoptera in exchange for European.

Coleoptera.—Civillehrer Barkowski, Bartenstein, East Prussia, Germany, wants American Coleoptera in exchange for European.

Wanted.—Rept. Entom. N. J., 1899.—Rept. U. S. Dept. Agri., 1887.—Separata of articles on Hymenoptera; also *Cossus*, *Hepialus*, *Micropteryx*, *Cis. Cupes*, *Parandra*, *Rhyssodes*. ♀ of *Methoca*, *Myrmosa*, *Chyphotes*; Chrysids; Bees and Wasps, *Melanoplus collinus*, *rectus*, ♂ *punctulatus*; *Dictyophorus*. *Asemoplus*, *Paratylotropidia*, *Haldemanella*, *Dactylotum*, *Ligurotettix*, *Morsea*.—W. H. Patton, Hartford, Conn.

Butterflies.—Good ones. From West Texas, Colorado and Missouri. One hundred species in duplicate. Also a few rare Catocalæ. Exchange for butterflies and Catocalæ of N. A.—G. M. Dodge, Louisiana, Mo.

N. A. Lepidoptera and their living pupa wanted. Will give in exchange exotic Lepidoptera.—Denton Brothers, Wellesley, Mass.

Will collect to order, next summer, insects of Guadalajara, Mexico.—J. F. McClendon, 3200 Guadalupe Street, Austin, Tex.

I have a complete set and index of Insect Life, also some odd numbers o exchange for works on Coleoptera not in my library.—L. H. Joutel, 164 East 117th Street, N. Y.

Lepidoptera—Odonata.—Wish to secure specimens of Butterflies and Dragonflies from North Carolina, of species not in my lists or collections. Correspondence invited.—Franklin Sherman, Jr., Dept. Agr., Raleigh, N. C.

Wanted.—North American *Geometridæ*, eastern and southern species (many of the commonest). Offered Lepidoptera, Coleoptera and Hemiptera, many good species, from British Columbia.—Geo. W. Taylor, Wellington, B C.

Catocala Andromache.—Will be supplied in exchange to a few of the larger collections while my duplicates last. O. C. Poling, Quincy, Illinois.

Please Notice.—After October 15th, 1902, my address will be College Station, Brazos Co., Texas.—E. Dwight Sanderson.

Wanted.—Geometers, named or unnamed, in exchange; also noctuids and Microlepidoptera.—Wm. H. Broadwell, 275 High St., Newark, N. J.

Desired.—Pupæ and perfect specimens of North American Lepidoptera, for cash or exchange. The Kny-Scheerer Co., Department of Natural Science, 225-233 Fourth Ave., N. Y. City, N. Y.

Notonectidæ and Aquatic Hemiptera.—Wanted from New York State especially; and in general from the United States. Write me stating what you want in return. J. R. de la Torre Bueno, 437 Central Park West, New York.

Lepidoptera.—I have *Thecla spadix*, *Calephelis nemesis*, *Lyc. sornorensis*, *Pamphila errans*, *Hemaris thetis* and other California butterflies to exchange for *Lycænidæ* and *Bombycidæ*. Fordyce Grinnell, Jr., Box 1034, Palo Alto, California.

Aphides.—I desire to obtain living aphides or plant lice. Can give named or unnamed Massachusetts insects of any order except Lepidoptera in exchange. C. T. Brues, Zoological Laboratory, Columbia University, New York City.

For Exchange.—Coleoptera of Southwestern Penna., in sets of four, with data for Coleoptera or Lepidoptera. Send lists, T. N. Brown, Uniontown, Pa.

Wanted.—Cerambycidæ (Longicorns) of the Americas. State number, price and locality. Fred. C. Bowditch, 164 Rawson Rd., Norfolk Co., Mass.

Coccids and Bees.—Correspondents are requested not to send me specimens for identification without first asking permission. My time is very limited, and I cannot work up all sorts of miscellaneous material. —T. D. A. Cockerell, East Las Vegas, N. M.

Pupæ Exchange.—Crysalids of H. Maia and others; also cocoons to exchange for other native pupæ and cocoons. W. T. Buxton, 152 Walnut St., Somerville, Mass.

Wanted—Cocoons *Attacus angulifera*, *ceanothi*, *gloveri*, *A. luna*, *E. imperialis*, to exchange for butterflies and moths. *Catocala* in papers from Illinois.—Adolf Mares, 1671 W. 23d St., Chicago, Ill.

Wanted, by purchase or exchange, photographic prints and lantern slides illustrative of insect life.—W. L. W. Field, Milton, Mass.

Diptera.—*Rhamphomyia* of the world wanted. Will exchange for Texas or Illinois insects (not Lepidoptera).—A. L. Melander, The University of Chicago.

Tortricidæ, Tineidæ and **Pyralidæ**—I will identify specimens of these subfamilies, from all N. Am. localities, for privilege of examination and records. Genera and specific names per Dyar's Catalogue. Will also exchange.—W. D. Kearfoot, 114 Liberty St., New York, N. Y.

Wanted—December, 1899, Entomological News. Address F. W. Friday, 17 Grace St., Pittsburg, Pa.

Wanted.—*Catocala* and *Sphinx* of the Northwest and Southwest in exchange for other native exotic and European butterflies and moths. Send list to Chas. F. Timm, 131 Ralph St., Brooklyn, N. Y.

Exchanges solicited in moths, butterflies of N. America. Catocalas preferred. Send lists to Jos. H. Reading, 775 N. Rockwell St., Chicago, Illinois

Lepidoptera from all parts of the world to exchange for species not in my collection.—Frank Haimbach, No. 1309 Allegheny Avenue, Philadelphia, Pa., U. S. A.

North American Butterflies wanted in exchange for Lepidoptera of Southern California.—P. H. Hart, Pasadena, Cal.

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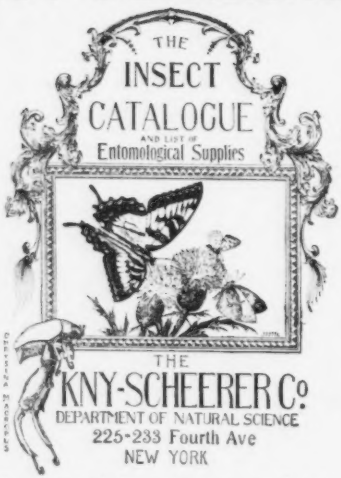

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